

# HAMPTON FALLS - HAMPTON I-95 BRIDGE & TAYLOR RIVER POND DAM PROJECT



## AGENDA

- Welcome
- Partners
- Goals
- Need
- Alternatives
- New Data
- Next Steps
- Questions or Comments

# PROJECT PARTNERS

- **NH Department of Transportation**
- **NH Department of Environmental Services**
- **NH Fish & Game Department**
- **Piscataqua Region Estuaries Partnership**
- **National Oceanic and Atmospheric Administration (NOAA)**
- **US Fish and Wildlife Service**
- **Gulf of Maine Council**



# GOALS OF MEETING

- **Solicit Input on Feasibility Study**  
(Draft July 24, 2009)
- **Present Updated Information**
- **Invite Consulting Parties for Section 106**

# PROJECT AREA



to Massachusetts



to Maine





# BRIDGE, DAM, AND FISHWAY



# NEED FOR THE PROJECT

- **Flooding concerns adjacent to Taylor River Pond**
- **Deteriorated Bridge**
- **Deteriorated Dam**
- **Deteriorated Fishway**

# SUMMARY OF ALTERNATIVES

- **Alternative A: No Action**
- **Alternative B: New Bridge, Dam and Fishway**
- **Alternative C: New Bridge, No Dam or Fishway**

# COSTS

**Alternative A - No Action: \$0**

**Alternative B - New Bridge, Dam and Fishway:**

- **\$ 385,000 = Remove Old Bridge, Dam and Fishway**
  - **\$4,840,000 = New Bridge**
  - **\$1,417,000 = New Dam and Fishway**
  - **\$ 200,000 = Sediment Removal and Disposal**
  - **\$1,900,000 = Roadway and Traffic Control**
- \$8,742,000 = Total Alternative B**

**\* Costs estimated above do not include Engineering, Right-of-Way or Property Value Impacts**



# COSTS

## Alternative C - New Bridge Only (No Dam and No Fishway)

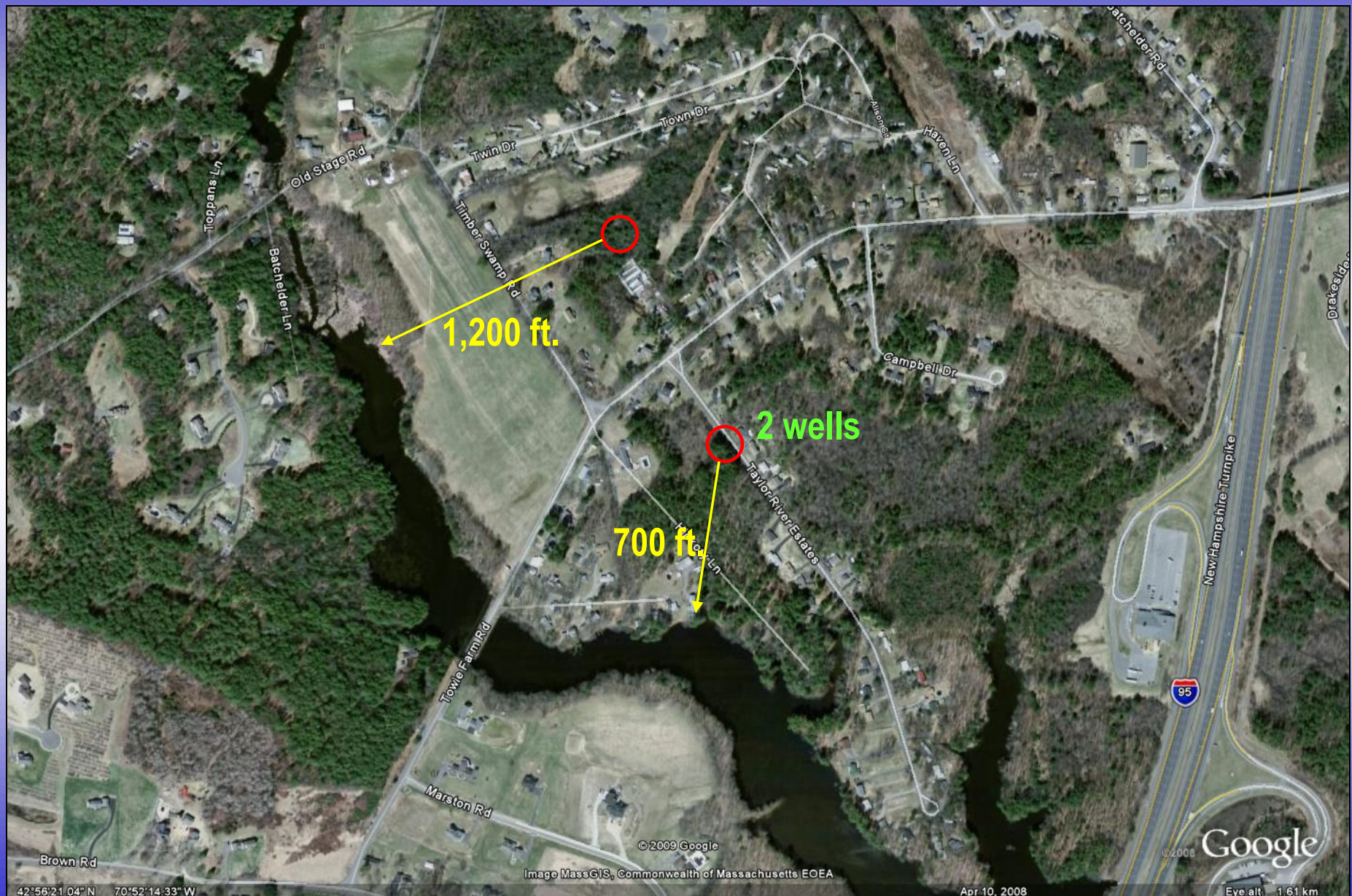
- \$ 385,000 = Remove Old Bridge, Dam and Fishway
  - \$4,840,000 = New Bridge
  - \$ 685,000 = Sediment Removal and Disposal
  - \$ 750,000 = Fire Cisterns
  - \$1,900,000 = Roadway and Traffic Control
- \$8,560,000 = Total Alternative C**

\* Costs estimated above do not include Engineering, Right-of-Way or Property Value Impacts

# WELL DATA

- **No Public Water Services in Hampton or Hampton Falls, all Private or Community Wells**
- **Researched Well Data within 1/4-mile of Taylor River Pond**
- **3 Community Wells:**
  - 2 Serving Taylor River Estates
  - 1 Serving Hemlock Haven Mobile Home Park
- **248 Private Property owners within Study Area:**
  - 118 use community wells
  - 130 use private wells

# COMMUNITY WELLS





# WELL DATA (cont.)

- **NHDOT mailed Questionnaires to all 248 Private Property Owners to obtain further Private Well Data**
- **83 Respondents to Questionnaires:**
  - **24 Private Community Well Users**
  - **59 Individual Well Users**
- **Most Wells are Bedrock, some shallow Wells drawing from Overburden**
- **Some Private Well Water Quality Analytical Data provided:**
  - **All met NHDES Drinking Water Standards**
  - **Chloride Levels were Within Standards**
  - **Saltwater Intrusion has Not occurred to-date at these Wells**

# WELL DATA (cont.)

## ➤ Alternatives A and B:

- No Impacts expected to Wells

## ➤ Alternative C:

- Private Wells: Potential Salt Water Intrusion within 200 feet of Pond
- Bedrock Well: Less likely to be impacted than shallow wells
- Shallow wells close to Pond: Susceptible to Salt Water Intrusion or to Reduction in Recharge Rate
- Community Wells: Potentially impacted due to higher Pumping Rate; however, unlikely due to Distance (700 and 1,200 feet) and higher Groundwater Levels



# FIRE PROTECTION

- **Existing Fire “Dry Hydrant”:**
  - On Towle Farm Road, in Hampton Falls
  - None using Taylor River in Hampton
  
- **Alternative A:**
  - No Impacts
  - Spillway Failure = Fire Protection Impaired until repaired
  
- **Alternative B:**
  - No Impacts

# FIRE PROTECTION (cont.)

## ➤ Alternative C:

- Not enough storage for Use of Dry Hydrant
- 100,000 gal Concrete Fire Cisterns required by Town Fire Chiefs:
  - Cistern #1 - NE side of Towle Farm Road, in Hampton
  - Cistern #2 - SW side of Towle Farm Road at Brown Road Intersection, in Hampton Falls
  - Each with Dry Hydrant, Gravel/Paved Pull-off area, and Concrete-filled Bollards for Traffic Protection

# SEDIMENT IN TAYLOR RIVER IMPOUNDMENT

- **Thickness: 1 foot (on average)**
- **Clay to medium sand**
- **Contain pesticides**
  - **No risk for human health from exposure to sediment**
  - **No risk from fish consumption if health advisories are followed**
  - **Sediment at lower impoundment poses risk to bottom-dwelling aquatic organisms and birds** (based on limited risk assessment)
- **Alternatives B and C require mitigation**

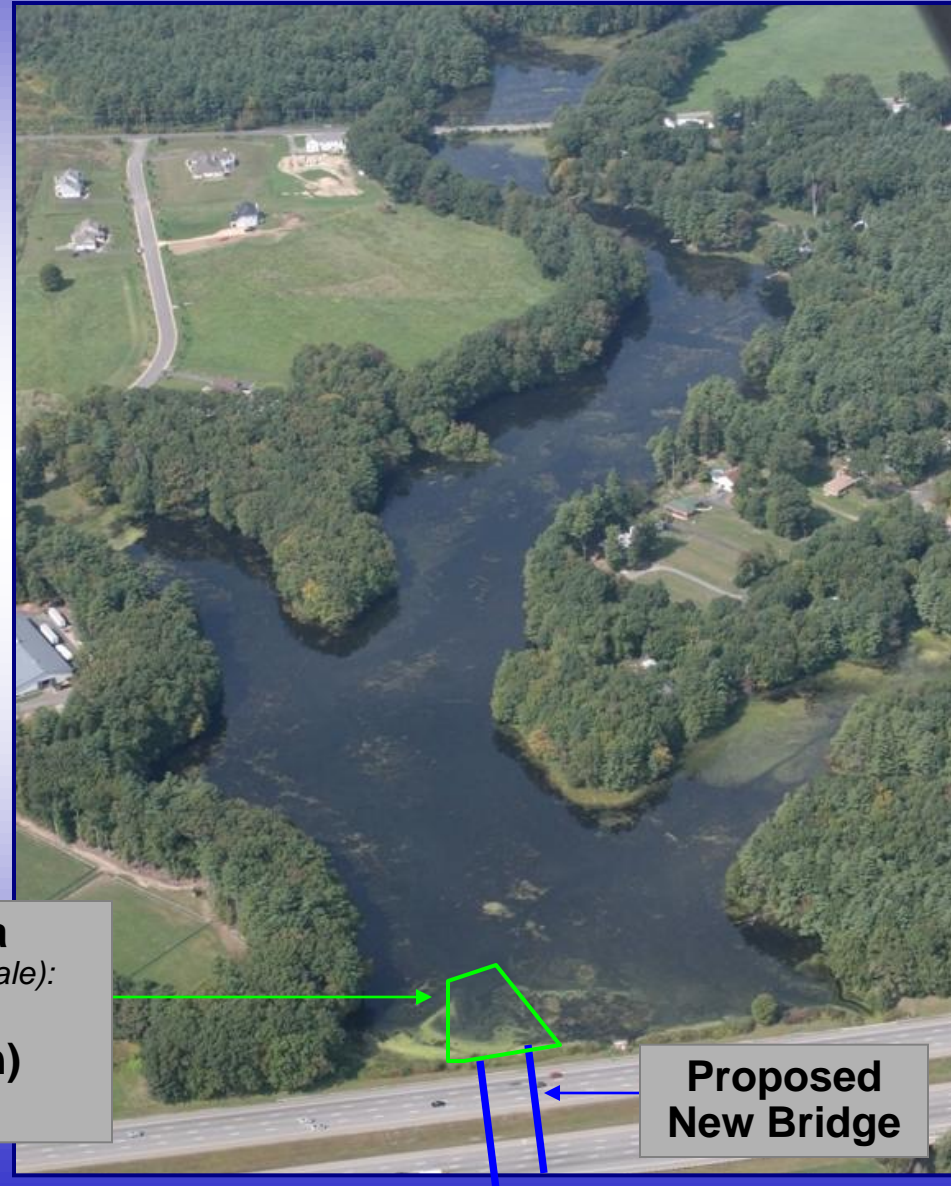


# SEDIMENT MANAGEMENT- Alternative B

- Removal of sediment in front of bridge (approx. 1,200 CY)
- Disposal at landfill or nearby state-owned land

**Excavation area**  
(preliminary; not-to-scale):  
60 ft (W, up)  
140 ft (W, down)  
160 ft (L)

**Proposed  
New Bridge**





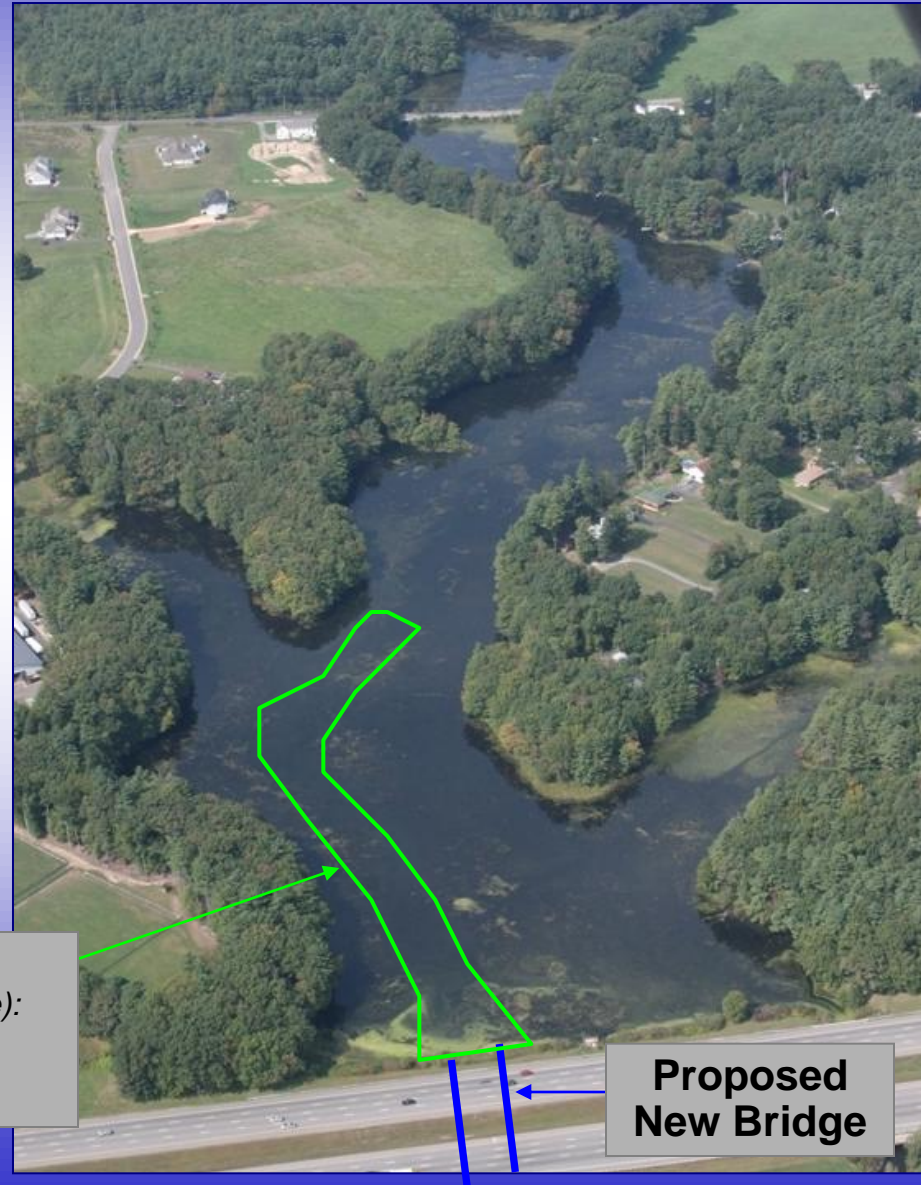
# SEDIMENT MANAGEMENT- Alternative C

## Option 1

- **Removal of sediment within channel in lower pond (approx. 7,000 CY)**
- **Disposal at landfill or nearby state-owned land**
- **Stabilization of exposed surfaces next to channel**

**Excavation area**  
(preliminary; not-to-scale):  
**100 ft (W)**  
**1,000 ft (L)**

**Proposed  
New Bridge**





# SEDIMENT MANAGEMENT- Alternative C

## Option 2

- Removal of sediment within channel in lower pond (approx. 7,000 CY)
- Disposal at landfill or nearby state-owned land
- Stabilization of exposed surfaces next to channel

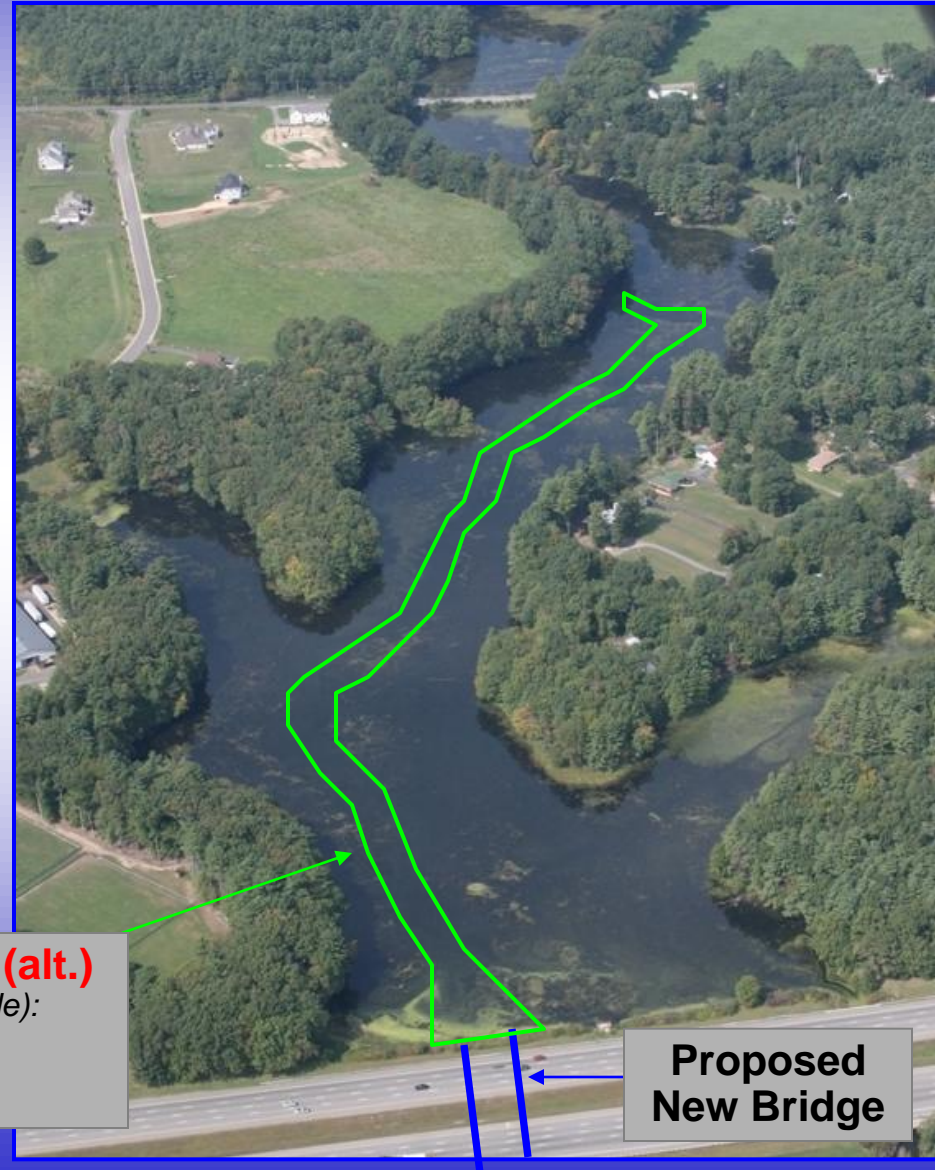
**Excavation area (alt.)**

*(preliminary; not-to-scale):*

**50 ft (W)**

**2,000 ft (L)**

**Proposed  
New Bridge**



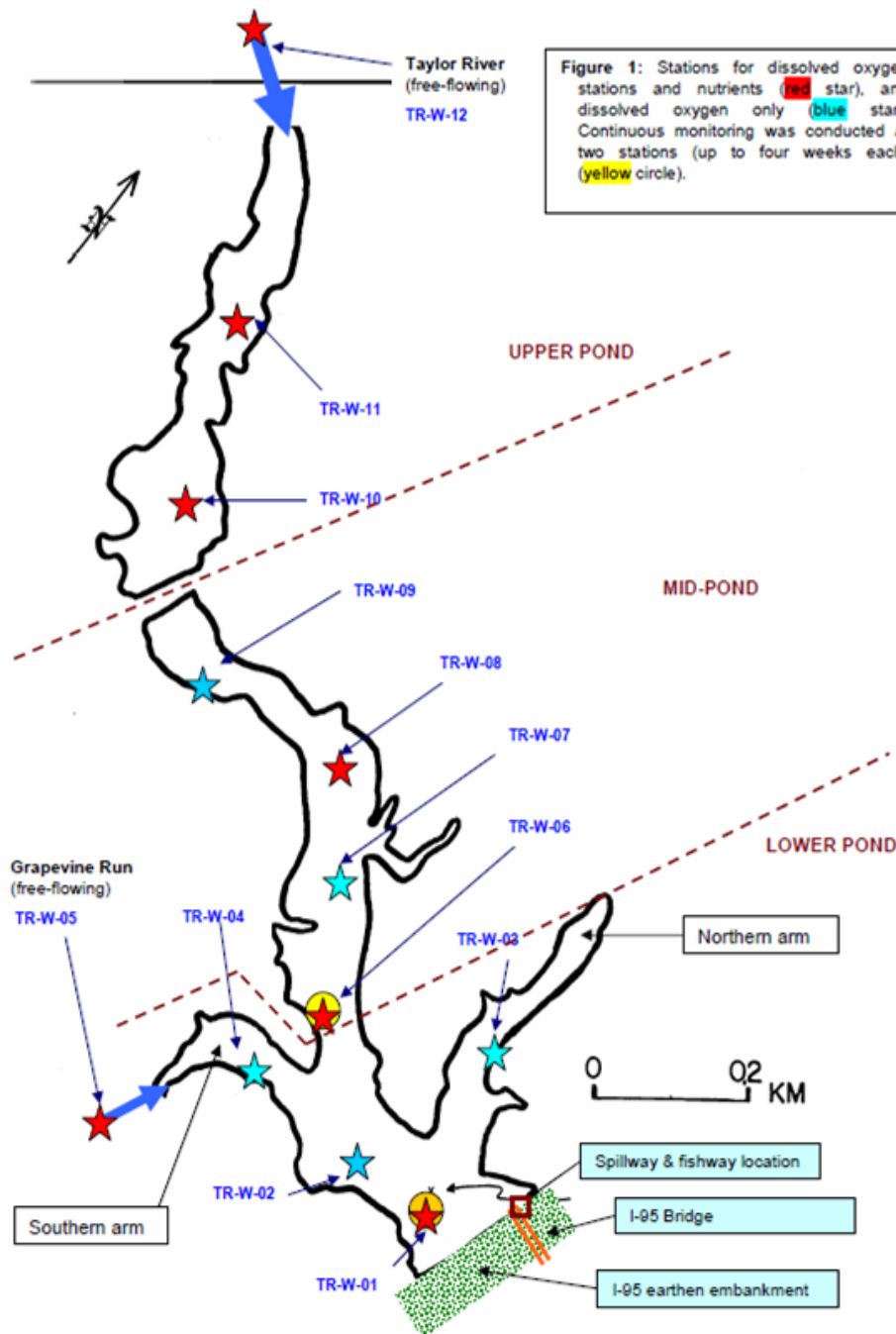
# WATER QUALITY

- **Salinity**
- **Dissolved Oxygen (DO)**
- **Nutrients**
- **Vascular plants**



# WATER QUALITY MONITORING STATIONS

Figure 1: Stations for dissolved oxygen stations and nutrients (red star), and dissolved oxygen only (blue star). Continuous monitoring was conducted at two stations (up to four weeks each) (yellow circle).

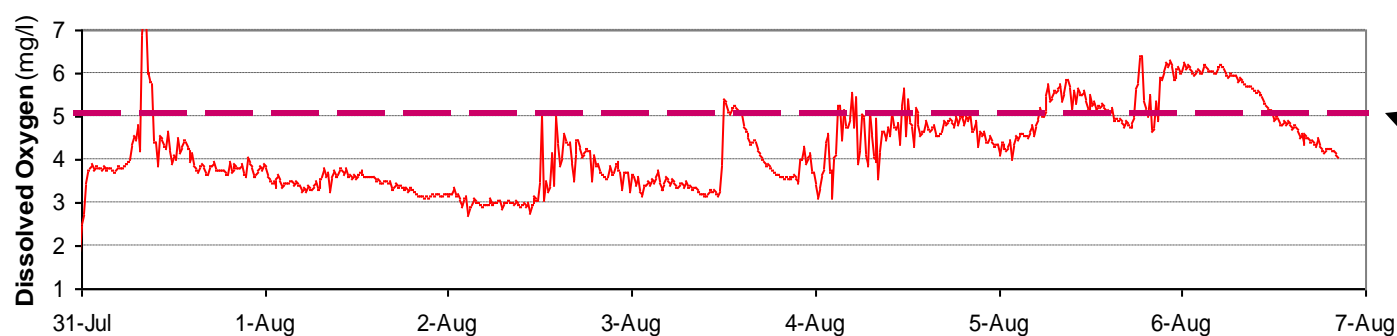
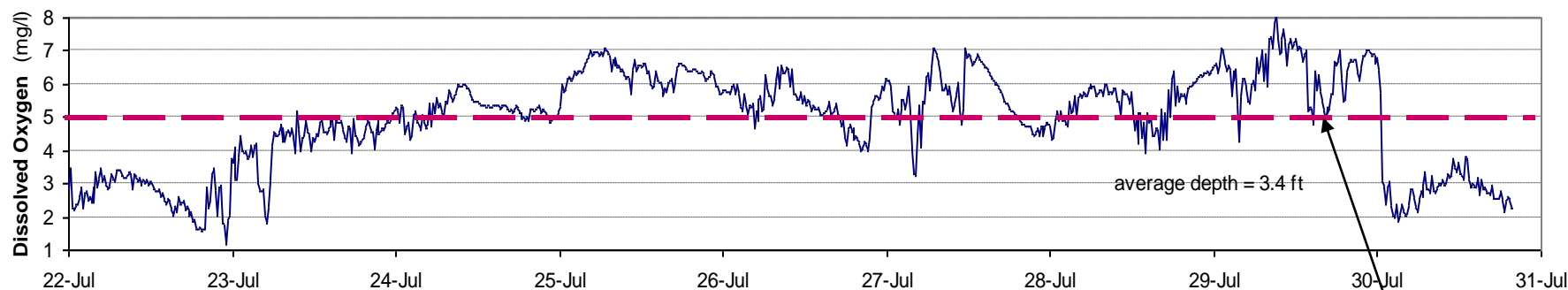


★ Dissolved Oxygen and Nutrients

★ Dissolved Oxygen

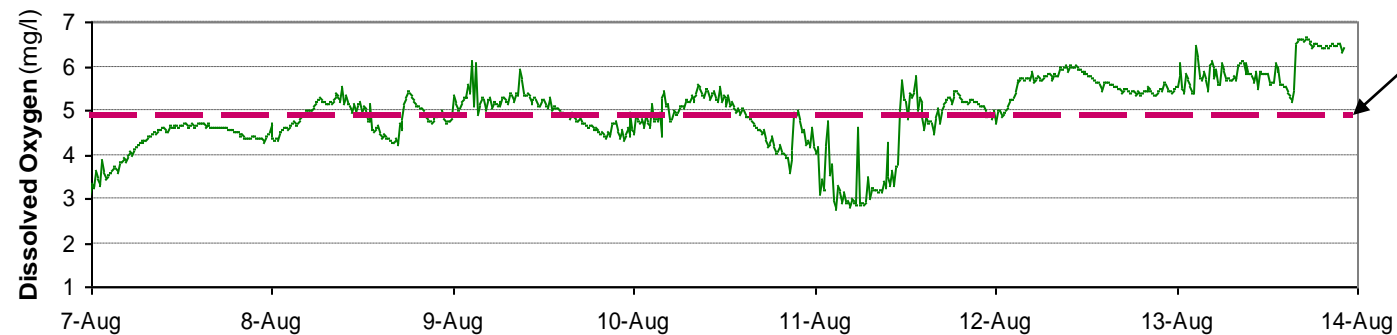
★ Continuous Monitoring

# DISSOLVED OXYGEN – Lower Pond, Jul/Aug 2008



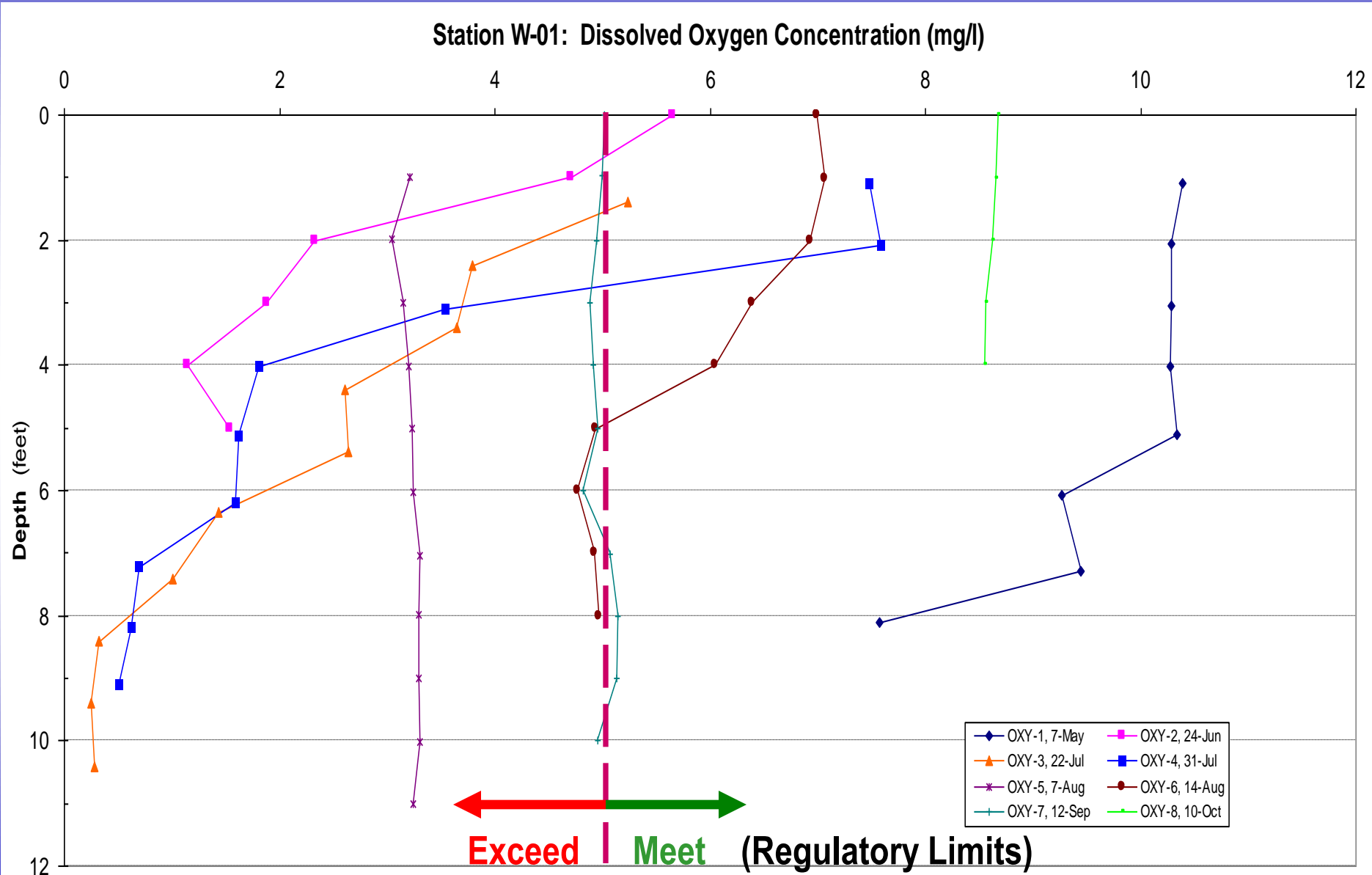
average depth = 3.4 ft

**Regulatory  
Limit: 5 mg/l**



average depth = 2.4 ft

# DISSOLVED OXYGEN – Vertical Profiles, 2008





# DISSOLVED OXYGEN - SUMMARY

- **Varies within Pond over Time and in different Areas**
- **Dissolved oxygen concentrations decrease during the summer well below the regulatory limit of 5 mg/l for Class B water**
- **Lowest DO at depth in submerged river channel**

# NUTRIENTS

## Eutrophic:

Water body with excessive nutrients causing algal blooms.

Negative environmental effects include anoxia and reductions in water quality, fish, and other animal population.

Trophic Level			Total Phosphorus	Chlorophyll a	Secchi Depth
			mg/l	mg/m <sup>3</sup>	feet
Oligotrophic			<0.010	<2.5	>6
Mesotrophic			0.010 - 0.035	2.5 - 8	3 - 6
Eutrophic			>0.035	>8	<3
Taylor River Pond - Surface Water (at a depth of 1 foot)					
Sampling Events	OXY-01	7-May-08	0.024 - 0.032		>2.6 - 5.6
	OXY-02	24-Jun-08	0.033 - 0.068	1.7 - 9.5	>3.0 - 6.0
	OXY-03	22-Jul-08	0.035 - 0.048	3.1 - 6.9	
	OXY-04	31-Jul-08		2.0 - 4.7	>3.5 - 6.0
	OXY-05	7-Aug-08	0.044 - 0.051	5.3 - 17.0	3.5 - 6.0
	OXY-06	14-Aug-08			>2.5 - 6.0
	OXY-07	12-Sep-08	0.036 - 0.042	2.2 - 4.2	>2.0 - 6.5
	OXY-08	10-Oct-08	0.025 - 0.045		>2.0 - 6.0
Taylor River Pond - Surface Water at W-01 and W-6 (at a depth of 6 feet)					
Sampling Events	OXY-01	7-May-08	0.028 - 0.030		
	OXY-02	24-Jun-08	0.030		
	OXY-03	22-Jul-08	0.035 - 0.067		
	OXY-04	31-Jul-08			
	OXY-05	7-Aug-08	0.049 - 0.052		
	OXY-06	14-Aug-08			
	OXY-07	12-Sep-08	0.035 - 0.160		
	OXY-08	10-Oct-08	0.067 - 0.080		

(\*) Trophic levels for **total phosphorus** as defined by NHDES are as follows:

Oligotrophic <0.010 mg/l

Mesotrophic 0.010 to 0.020 mg/l

Eutrophic >0.020 mg/l

# VASCULAR PLANT SURVEY

## Low/Moderate Growth Effects

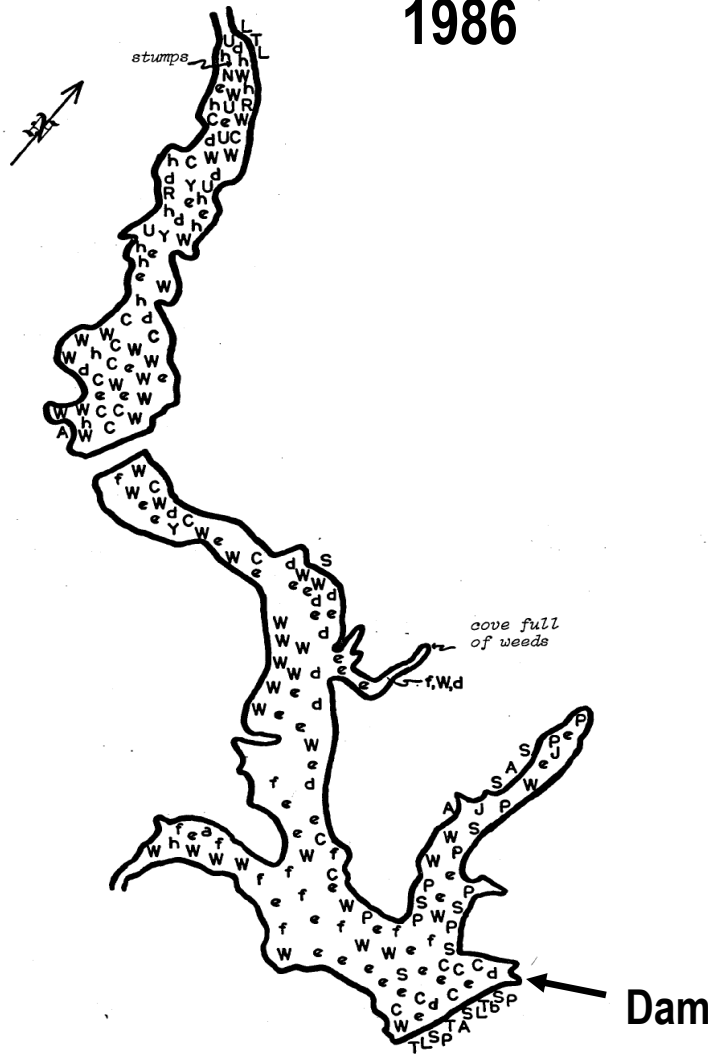
- Removes and stores nutrients
- Food and shelter for fish and invertebrates

## Excessive Growth Effects

- Clogs waterways
- Hampers fishing, boating and swimming activities
- Endangers fish health - plant die-offs result in declining levels of DO.

# VASCULAR PLANT SURVEY

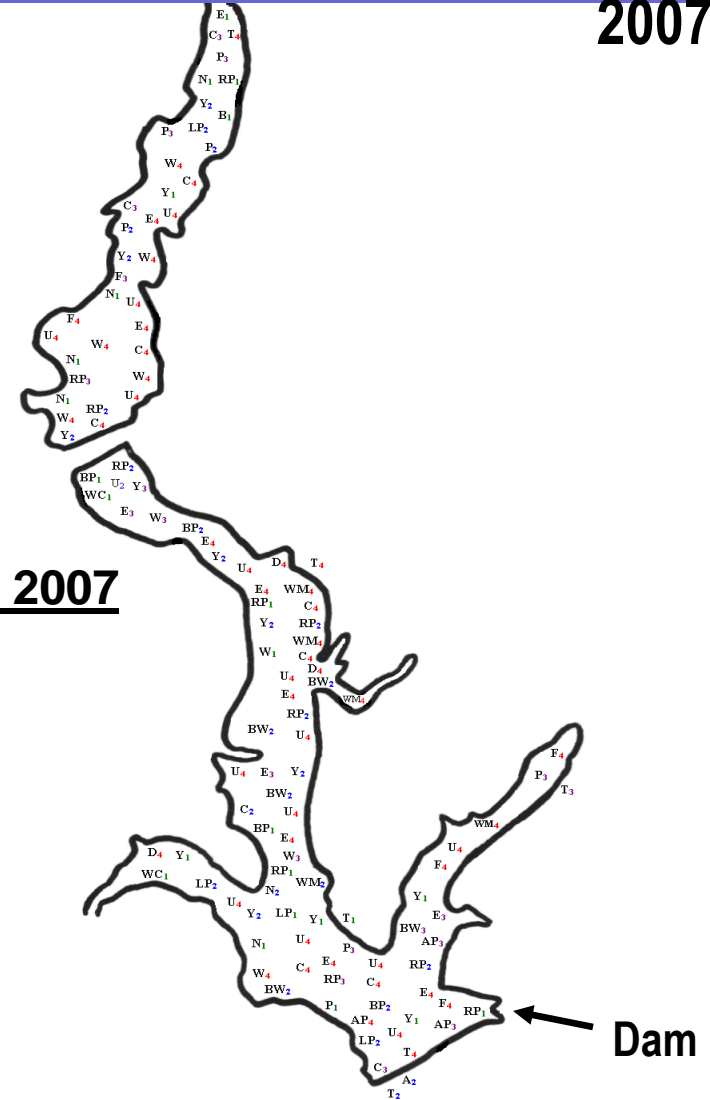
# 1986



## New Species

- Watermeal
- Wild Celery

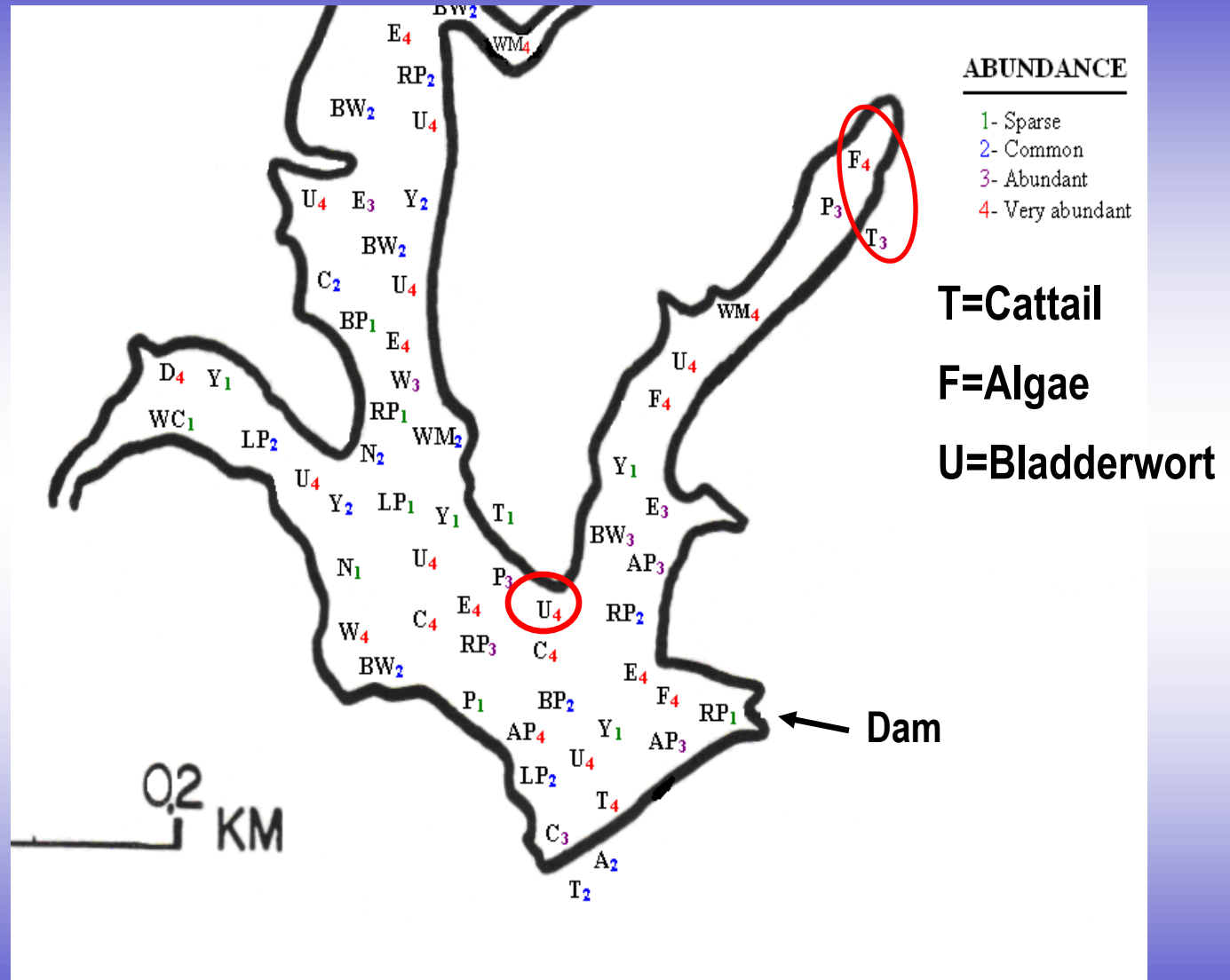
# 2007



## Species Absent in 2007

- Purple Loosestrife
- Bur reed
- Stonewort
- Aquatic Buttercup

# VASCULAR PLANT SURVEY





# TAYLOR RIVER - EUTROPHIC

**Eutrophic:** Water body with excessive nutrients causing algal blooms. Negative environmental effects include anoxia and reductions in water quality, fish, and other animal population. Supports only warmwater fish species.

- Dissolved oxygen low
- Elevated phosphorus/chlorophyll concentrations
- High density of submerged and floating vegetation



# FISHERIES

## DIADROMOUS FISH IN THE TAYLOR RIVER

American eel



River herring

Alewife



Blueback herring



## *Resident Fish in the Taylor River*

### *Warmwater Species*



Eastern chain pickerel

# DIADROMOUS FISHERIES

YEAR	COCHECO RIVER	EXETER RIVER	OYSTER RIVER	LAMPREY RIVER	TAYLOR RIVER	WINNICUT RIVER
1972				2,528		+
1973				1,380		+
1974				1,627		+
1975		2,639		2,882		+
1976	9,500		11,777	3,951	450,000	+
1977	29,500		359	11,256		2,700++
1978	1,925	205	419	20,461	168,256	3,229++
1979	586	186	496	23,747	375,302	3,410++
1980	7,713	2,516	2,921	26,512	205,420	4,393++
1981	6,559	15,626	5,099	50,226	94,060	2,316++
1982	4,129	542	6,563	66,189	126,182	2,500++
1983	968	1	8,866	54,546	151,100	+
1984	477		5,179	40,213	45,600	+
1985	974		4,116	54,365	108,201	+
1986	2,612	1,125	93,024	46,623	117,000	1,000++
1987	3,557	220	57,745	45,895	63,514	+
1988	3,915		73,866	31,897	30,297	+
1989	18,455		38,925	26,149	41,395	+
1990	31,697		154,588	25,457	27,210	+
1991	25,753	313	151,975	29,871	46,392	+
1992	72,491	537	157,024	16,511	49,108	+
1993	40,372	278	73,788	25,289	84,859	+
1994	33,140	*	91,974	14,119	42,164	+
1995	79,385	592	82,895	15,904	14,757	+
1996	32,767	248	82,362	11,200	10,113	+
1997	31,182	1,302	57,920	22,236	20,420	+
1998	25,277	392	85,116	15,947	11,979	219
1999	16,679	2,821	88,063	20,067	25,197	305
2000	30,938	533	70,873	25,678	44,010	525
2001	46,590	6,703	66,989	39,330	7,065	1,118
2002	62,472	3,341	58,179	58,605	5,829	7,041
2003	71,199	71	51,536	64,486	1,397	5,427
2004	47,934	83	52,934	66,333	1,055	8,044
2005	16,446	66	12,882	40,026	223	2,703
2006	4,318	16	6,035	23,471	147	822
2007	15,815	40	17,421	55,225	217	7,543
2008	30,686	174	20,780	36,247	976	8,359

➤ Taylor River may be one of the better systems in the Hampton/Seabrook Estuary with potential for diadromous fish restoration

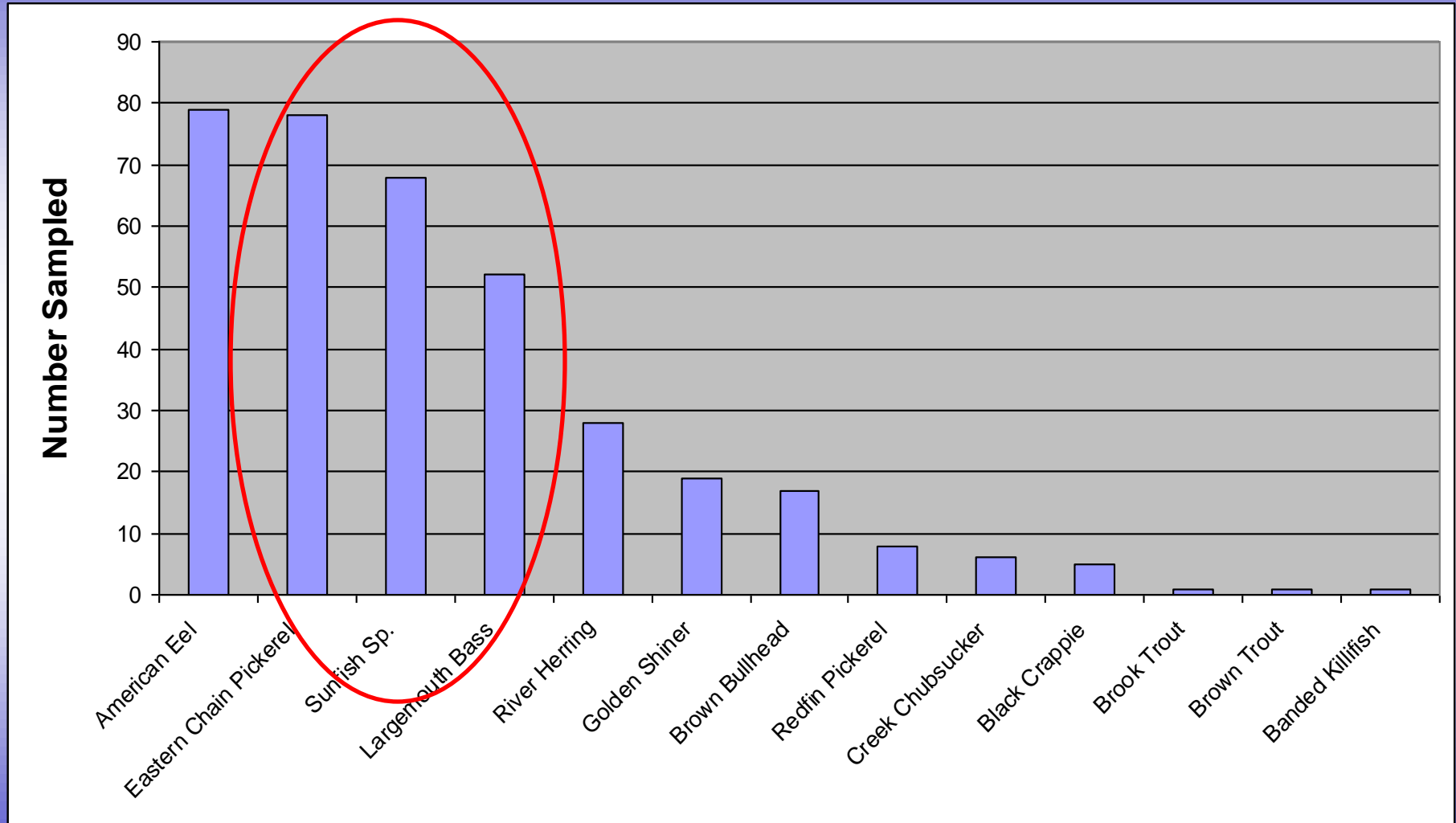
➤ NHF&G actively trying to restore diadromous fish species to the Taylor River

➤ River herring have a low tolerance to low DO levels and poor water quality

November 2009

# FISHERIES

## SAMPLED FISH SPECIES IN THE TAYLOR RIVER, 1985-2007





# FISHERIES

## ➤ Alternative A: No Action

- Diadromous and resident species continue to be affected by eutrophic environment.

## ➤ Alternative B: New Bridge, Dam and Fishway

- Diadromous and resident species continue to be affected by eutrophic environment.

## ➤ Alternative C: New Bridge, No Dam or Fishway

- Freshwater fish species in freshwater reach and estuarine and migratory species in tidal reach.

# POTENTIAL MARKET VALUES

## Potential Market Value Loss with Dam Removal

- **20 % on Taylor River Pond Waterfront Properties**
- **10% on Hampton Common Access Waterfront Properties**
- **5% on Hampton Falls Properties**

(Source: May 20, 2009 NHDOT memo)

# PROPERTY VALUES

Provencher, B.; Sarakinos, H.; and Meyer, T. 2008. Does small dam removal affect local property values? An empirical analysis. Contemporary Economic Policy 26(2): 187-197.

- No statistical impact of dam removal on resale values of waterfront properties relative to properties on intact impoundments
- The most valuable properties were at sites where the river has been free-flowing for at least 20 years

Lewis, L.; Bohlen, C.; and Wilson, S. 2008. Dams, dam removal, and river restoration: A hedonic property value analysis. Contemporary Economic Policy 26(2): 175-186.

- Properties near dams have lower value than similar properties further away
- Land values are tied to water quality

# CULTURAL RESOURCES

## National Historical Preservation Act/Section 106

- Architectural Resources: N/A
- Archeological Resources: Potentially w/ Dam Removal
- Consulting Parties

# NEXT STEPS

- **Receive Public Comments**
- **Finalize “Draft” Feasibility Study**
- **Select Alternative**
- **Future Public Meeting(s)**



# QUESTIONS OR COMMENTS

